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(21) International Application Number: PCT/EP97/02713 (22) International Filing Date: 17 May 1997 (17.05.97) (30) Priority Data: 9610378.3 17 May 1996 (17.05.96) GB (71) Applicant (for all designated States except US): THE BOOTS COMPANY PLC [GB/GB]; 1 Thane Road West, Nottingham NG2 3AA (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): SAVJI, Rajesh [GB/GB]; The Boots Company PLC, 1 Thane Road West, Nottingham NG2 3AA (GB). HANRAHAN, Brian [GB/GB]; The Boots Company PLC, 1 Thane Road West, Nottingham NG2 3AA (GB). (74) Agent: THACKER, Michael, Anthony; The Boots Company plc, Building D31, Group Patents Dept., 1 Thane Road West, Nottingham NG2 3AA (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: HAIR COLORANT COMPOSITIONS (57) Abstract <p>There is disclosed a hair colorant composition comprising an agent which will colour, tint and/or dye the hair and a alkali metal bicarbonate, especially sodium bicarbonate, present in an amount sufficient to enhance the length and intensity of the hair colour produced by the composition. The hair colouring agent may comprise a suitable cationic dye. The hair colorant composition may further comprise an anti-free-radical agent and/or a polymeric conditioning agent prepared from monomer entities selected from one or more of: acrylic acid, acrylamide dimethylallylammonium chloride and any mixtures thereof. There is further described a container comprising a chamber comprising the flowable hair colorant composition the chamber being in fluid connection with a dispensing means such that composition is capable of being applied to the hair by the dispensing means, preferably the dispensing means comprising a brush through which the composition may flow.</p>		

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HAIR COLORANT COMPOSITIONS

The present invention relates to compositions used to colour the hair, to methods of preparing such compositions, to methods of using such compositions to treat hair and means to dispense such a compositions onto the
5 hair.

The term "hair colorant composition" as used herein comprises any composition which colours, tints and/or dyes the hair. Such compositions may comprise so-called "hot oil" treatments, shampoos, conditioners, hair dyes, mousses, foams, gels, creams, lotions and rinses.

10 Prior art compositions used to colour the hair have various disadvantages. The new colour fades after typically 6 to 8 subsequent washes of the hair. Such colorant compositions are said to semi-permanently colour the hair. A semi-permanent colorant treatment as used herein is one in which one or more coloured chemical entities are applied to the hair and are absorbed thereon to
15 give the desired coloration which is progressively removed each time the hair is shampooed. Conventionally such semi-permanent hair colorant compositions are progressively removed over 6 to 8 shampooings. Thus to retain the new colour over a long period repeated treatment with hair colorant is required. This is inconvenient and expensive. The ingredients used in many hair colorant
20 compositions are often fairly noxious and therefore it may also be desirable to reduce the number of times hair is exposed to such compositions and / or reduce or remove the more noxious ingredients from such hair colorant compositions.

Therefore it is an object of the present invention to overcome some or all of the
25 aforementioned disadvantages, and in particular to provide hair colorant

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compositions which are gentler and / or produce a longer lasting hair colour than prior art compositions.

Surprisingly it has been discovered that if an alkali metal bicarbonate is added to a hair colorant composition the colour produced lasts longer and in particular
5 is more resistant to washing of the hair. A particularly advantageous alkali metal bicarbonate comprises sodium bicarbonate.

Sodium bicarbonate (baking soda) is well known to be an effective deodoriser and helps absorb odours. It has been used traditionally in the home where its gentle alkaline characteristics neutralise the acidic results of bacterial attack
10 such as sour milk and oxidised wine. More unpleasant acidic odours such as vomit are quickly rendered inoffensive by baking soda.

Sodium bicarbonate has also been used in oral hygiene products. The alkalinity of the baking soda neutralises the unpleasant tastes and odours of decaying food trapped between the teeth. The sodium bicarbonate also
15 imparts a tingly slightly bitter flavour to give an impression of freshness that can be quite addictive and encourages more frequent attention to dental hygiene.

Sodium bicarbonate has also been incorporated into toiletry products to treat body odours. Such prior art products comprising sodium bicarbonate include for example: Johnson & Johnson's "Shower to Shower" shower talc; underarm
20 deodorants available commercially from inter alia Home Health, St Ives Laboratories, Church & Dwight and Colgate Palmolive; hair shampoos and / or conditioners available commercially from inter alia Western Pleasure and Jherri Redding; and Andrew Jergens' "Jergens Natural" soap bar.

It can be seen therefore that sodium bicarbonate is a widely used ingredient
25 in cosmetic and toiletries compositions. However it is unexpected that sodium

bicarbonate produces enhanced and / or synergistic effects in the colour produced by hair colorant compositions.

Broadly in accordance with the present invention there is provided a hair colorant composition comprising an agent which will colour, tint and / or dye the hair and a alkali metal bicarbonate present in an amount sufficient to enhance the retention and intensity of the hair colour produced by the composition, preferably the enhancement is synergistic.

Preferably the hair colouring agent comprises one or more suitable cationic dyes.

As is well known in the art the colour required is achieved by mixing dyes of different colours in appropriate amounts. Examples of suitable dyes for use in the present invention include:

	<u>Commercial Name</u>	<u>INCI Name</u>
15	Arianor Steel Blue	Basic Blue 99
	Arianor Sierra Brown	Basic Brown 17
	Arianor Mahogany	Basic Brown 16
	Arianor Straw Yellow	Basic Yellow 57
	Arianor Madder Red	CI 12245
20	HC Red 3	HC Red No. 3
	HC Blue 2 Robinsons	HC Blue No. 2
	HC Yellow 4	HC Yellow No. 4
	Lowadene Orange 3	Acid Orange 3

Preferably the alkali metal bicarbonate comprises sodium bicarbonate.

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The alkali metal bicarbonate used in the present invention, particularly sodium bicarbonate, are believed to act to swell the hair thus aiding absorption of the hair colouring agent by the hair. This aids production of in an artificial colour on the hair which has improved resistance to fading during subsequent washing.

- 5 If the alkali metal bicarbonate comprises sodium bicarbonate the hair colorant composition may be applied once to produce a hair colour lasting for at least 8, typically 18 to 21, washes before fading significantly. Preferably the sodium bicarbonate is present in amount from about 1% by weight of the total composition to an amount which produces the maximum value of pH in the hair
10 colorant composition which would be cosmetically acceptable.

- Use of a alkali metal bicarbonate, in particular sodium bicarbonate, in hair colorant compositions of the present invention may have one or more of the following further advantages which are useful for hair care compositions: it may mop up free fatty acids on the skin and scalp and have an anti-acne and / or
15 anti- dandruff effect; it may act as a deodorant by absorbing acidic odours; it may act as a mild exfolient (at concentrations above about 5 % by weight NaHCO_3 may also as an abrasive); it may dissolve or neutralise dandruff flakes before they occur; it may act as a protein denaturant to improve absorption of active ingredients on the hair; and it may act as a toner for skin and / or hair by
20 saponifying free acids to emulsify oils on the skin and / or hair which is particularly useful for greasy skin.

- Preferably the hair colorant compositions of the present invention are gentle on the skin in that they comprise ingredients other than hydrogen peroxide (H_2O_2) and / or ammonia (NH_3). The absence of such noxious ingredients permits use
25 of greater amounts of alkali metal bicarbonate without raising the pH of the hair colorant composition to a level which would be cosmetically unacceptable.

Free radicals, which are generated by factors such as UV radiation (present in sunlight), heat and/or by chemical reaction, are implicated in the process of damage to hair and fading of hair colour. It would therefore be further advantageous if the hair colorant compositions of the present invention are provided with means to generate lower levels of free radicals than known hair colorant compositions to provide improved protection against the fading of the coloured hair by sunlight and against damage to hair caused by exposure to factors such as sunlight, environmental and/or atmospheric pollution, heat from styling the hair and / or chemical treatment of the hair (for example curling, perming, straightening, dyeing and/or bleaching).

The hair colorant composition according to the present invention may further comprise an anti-free-radical agent. Such anti-free-radical compositions are further described in the applicant's co-pending international patent application WO96/36312, the disclosure of which is hereby incorporated herein by reference.

The anti-free-radical agent may be, for example ascorbic acid, vitamin E (tocopherol), lipacide LHL, phytoamine or herbal extract such as mimosa tenuiflora AA (available commercially from A & E Cannock), ginkgo biloba extract (available commercially from Indena), or birch extract. Preferred anti-free-radical agents are selected from one or more of: ascorbic acid, tocopherol and herbal extract. Particularly preferred anti-free-radical agents are selected from ginkgo biloba extract and birch extract. Ginkgo biloba extract may be produced by extracting the leaves of the ginkgo biloba tree with a suitable solvent. It is believed that the anti-free-radical activity of ginkgo biloba extract arises from the presence of flavonglycosides and/or terpenelactones which may be free-radical inhibitors. Birch extract may be produced by extracting the dried leaves of *Betula alba* with a suitable solvent. It is believed that the anti-free radical activity of birch extract arises due to the presence of flavonoids such as hyperosid, quercitrosid and/or myricetol-3-digalactosid

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which may be free-radical inhibitors. A suitable birch extract comprises those available from Cosmetochem (U.K.) Ltd under the trade names "Super Herbasol Extract Birch" and "HP Herbasol Betula" and those available from Blagden Chemicals under the tradenames "Phytelene of Birch" and "Aqueous Spray Dried Birch".

The anti-free-radical agent may consist of active ingredients which are free-radical inhibitors or may also comprise suitable diluents and/or carriers (such as when the anti-free radical agent is some of the products mentioned herein). It will be appreciated that the anti-free-radical agent is not limited to one or more of those anti-free-radical agents listed above and is not limited to those anti-free-radical agents comprising the ingredients described above.

Preferably, the anti-free-radical agent may be present in an amount of from about 0.01% to about 10% by weight, more preferably from about 0.05% to about 5% by weight, most preferably from about 0.15% to about 3.0% by weight of the composition.

To further reduce the generation of free-radicals by the UV radiation in sunlight, hair colorant compositions of the present invention may further comprise any acceptable sunscreens agent (that is an agent which acts to absorb and/or reflect UV radiation present in sunlight) and which would be acceptable for use in a hair-care composition (for example suitable for use on the human head). Such sunscreens agents may comprise inorganic sunscreens (for example zinc oxide and/or titanium dioxide preferably of microfine (< 100 nm) particle size) and/or organic sunscreens (for example p-aminobenzoic acids, esters and derivatives, methoxycinnamate esters, benzophenones [such as benzophenone-4 {available commercially under the trade name Uvinul MS40}]; dibenzoylmethanes and / or salicylate esters). The sunscreens agents may be present in an amount of from about 0.1% to about 10% by weight of the composition.

The hair colorant composition according to the present invention may further comprise a polymeric conditioning agent prepared from monomer entities selected from one or more of: acrylic acid, acrylamide dimethyldiallylammonium chloride and any mixtures thereof. Suitably, the polymeric conditioning agent is
5 a copolymer of acrylic acid and acrylamide monomer entities, and may comprise further co-monomers.

Preferably the polymeric conditioning agent is a polymer of dimethyldiallylammonium chloride monomer entities, more preferably a copolymer further comprising acrylamide co-monomer entities, most preferably
10 the copolymer still further comprising acrylic acid co-monomer entities.

In one embodiment, the polymeric conditioning agent is a terpolymer comprising acrylic acid, acrylamide and dimethyldiallylammonium chloride co-monomers. Suitably these co-monomers are present in weight ratios of about 1 to about 2 to about 1 respectively.

15 Particularly preferred polymeric conditioning agents are the polymers known under the following CTFA designations: 'polyquaternium 39' which is a terpolymer of dimethyldiallylammonium chloride, acrylamide and acrylic acid co-monomers (available commercially from Chemvicon Speciality Chemicals under the trade names 'Merquat Plus 3330' and 'Merquat Plus 3331');
20 'polyquaternium 7' which is a copolymer of dimethyl-diallylammonium chloride and acrylamide co-monomers (available commercially from Chemvicon Speciality Chemicals under the trade name 'Merquat S'); and 'polyquaternium 6' which is a homopolymer of dimethyldiallylammonium chloride monomers (available commercially from Chemvicon Speciality Chemicals under the trade
25 name 'Merquat 100').

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The polymeric conditioning agent may be present in the composition in an amount of from about 0.001% to about 10% by weight, suitably from about 0.01% to about 5% by weight, for example about 1% by weight.

Further components may be added to the hair-care composition as is
5 well-known to those skilled in the art.

For example, preservatives may be added to the composition such as 2-bromo-2-nitropropane-1,3-diol (bronopol, which is available commercially under the trade name Myacide), benzyl alcohol, diazolidinyl urea, imidazolidinyl urea, methyl paraben, phenoxy ethanol, propyl paraben, sodium methyl
10 paraben and sodium propyl paraben, suitably in an amount of from about 0.01% to about 10% by weight of the composition.

Thickeners and viscosity modifying agents may be added to the composition, such as amine oxides, block polymers of ethylene oxide and propylene oxide (for example, those available from BASF Wyandotte under the trade name
15 "Pluronic"), ethoxylated fatty alcohols, cellulosic derivatives such as hydroxypropylmethyl cellulose, salt (NaCl), phthalic acid amide, polyvinyl alcohols and fatty alcohols, suitably in an amount of from about 0.5% to about 10% by weight of the composition.

Sequestering agents may be added to the composition, such as
20 ethylenediamine tetraacetic acid and salts thereof, suitably in an amount of from about 0.005% to about 0.5% by weight of the composition.

The composition may also include vitamins such as biotin, suitably in an amount of from about 0.01% to about 1.0% by weight of the composition.

The composition may also include gelling agents such as PVM, MA, or a decadiene crosspolymer (available under the trade name Stabirez 06), suitably in an amount of from about 0.1% to about 2% by weight of the composition.

The composition may also comprise suitable, cosmetically acceptable diluents
5 or carriers.

Perfumes may be added suitably in an amount of from about 0.01% to about 2% by weight of the composition, as may water soluble dyes such as tartrazine, suitably in an amount of from about a trace amount (such as 1×10^{-5} %) to about 0.1% by weight of the composition.

10 The composition may be buffered by additional buffering means well known in the art, for example by use of buffer systems comprising succinic acid, citric acid, lactic acid, and acceptable salts thereof, phosphoric acid, mono- or disodium phosphate and sodium carbonate. Suitably, the composition may have a pH in a range in which the advantageous properties of the hair colorant
15 compositions described herein are present, preferably a pH of between about 7 and about 10, more preferably about 9.

Surfactants may be included, such as cosmetically acceptable salts of alkyl ether sulphates, alkyl and alkylamidoalkyl betaines, ethoxylated alcohols, polyethyleneglycol carboxylates, acceptable salts of alkyl sulphates (such as
20 ammonium lauryl sulphate), sulphosuccinates (such as disodium laureth sulphosuccinate), amphotoacetates and amphodiacetates (such as disodium cocoamphodiacetate), alkylpolyglucosides and alcohol sulphonates.

Broadly in accordance with a further aspect of the present invention there is provided a method of preparing a hair colorant composition as described herein
25 comprising mixing in a suitable manner a alkali metal bicarbonate (such as any of those described herein), a hair colouring agent (such as a suitable cationic dye) and a suitable carrier. Optionally any other suitable ingredients may be

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added such as those described herein. A preferred method of preparation is described in the example.

5 The hair colorant compositions of the present invention may be stored sold and/or applied to the hair from a container comprising an integral brush head through which the composition may flow on application to the hair. Such a container aids complete and even application of the hair colorant composition to the hair to avoid or reduce unintentional streaking or uneven colour intensity in the resultant artificially coloured hair.

10 Therefore in accordance with a yet further aspect of the present invention there is provided a container comprising a chamber comprising a flowable hair colorant composition as described herein, the chamber being in fluid connection with a dispensing means such that composition is capable of being applied to the hair by the dispensing means. Preferably the dispensing means comprises a brush or sponge through which the composition may flow.

15 Broadly in accordance with a still further aspect of the present invention there is provided a method of colouring, tinting and / or dying the hair by application of a hair colorant composition as described herein, preferably in a single application to the hair.

20 The compositions of the present invention will now be illustrated by the following non-limiting example. The term "% w/w" indicates percentage mass of an ingredient per total mass of the composition.

Example 1

	<i>Ingredient</i>	<i>% w/w</i>
	Natrosol 250 Hr	0.5
	Sequestrene NA4	0.1
5	Propylene glycol	5
	PEG -2-cocamine	1
	Phenonip	0.2
	Cetyl alcohol	3.5
	Perfume	0.2
10	Uvinol MS 40	0.2
	Cetomacrogol	1
	Sodium bicarbonate	1
	Suitable cationic dye	variable %
	30 % NaOH	suitable amounts
15	Citric acid	suitable amounts
	Purified water	to 100 %

The above ingredients were used as follows to prepare a hair colorant composition. The Natrosol 250 HR was added to water and the mixture was stirred. The Sequestrene NA2 was dissolved in water and added to the

20 Natrosol mixture, followed by the cetyl alcohol, Cetomacrogol and PEG-2-cocamine. The resultant mixture was heated until it melted. The mixture was cooled to 35 °C and a solution of the dyes in propylene glycol was added. The sodium bicarbonate was dissolved in the minimum amount of water and added to the result mixture. The Uvinol MS 40 was also dissolved in water

25 and added to the remaining ingredients. The perfume and phenonip were added and the mixture was homogenised. The 30% NaOH and citric acid were used as pH adjusting agents in suitable amounts to modify the pH of the resultant hair colorant composition to between 8 and 9.

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Compositions prepared as above were tested to determine colour retention on hair swatches of hair. Similar compositions having the same pH but containing no sodium bicarbonate were used as a comparator. The hair swatches used were a) hair which had not been treated with any perming agent (hereinafter virgin hair), b) hair which had been treated with a perming agent for half the recommended processing time, and c) hair which had been treated with a perming agent for the full recommended processing time. The swatches were coloured using the above formulation and the intensity of the colour determined colorimetrically. The swatches were then washed in a shampoo, rinsed and blow dried. The intensity of the colour was determined colorimetrically and by visual comparison with a swatch of virgin hair which had been coloured at the same time and in the same way as the test samples. These observations showed that the swatches which had been treated with the compositions of the present invention (i.e. those containing sodium bicarbonate) retained the intensity of their colour through more washes than the swatches treated with the composition containing no sodium bicarbonate.

CLAIMS

- 1 A hair colorant composition comprising an agent which will colour, tint and /
or dye the hair and a alkali metal bicarbonate present in an amount sufficient to
enhance the retention and intensity of the hair colour produced by the
5 composition.
- 2 A hair colorant composition as claimed in claim 1 in which the alkali metal
bicarbonate comprises sodium bicarbonate.
- 3 A hair colorant composition as claimed in claim 2, in which the sodium
bicarbonate is present in amount from about 1% by weight of the total
10 composition to an amount which produces the maximum value of pH in the hair
colorant composition which would be cosmetically acceptable.
- 4 A hair colorant composition as claimed in any preceding claim, in which the
hair colouring agent comprises a suitable cationic dye.
- 5 A hair colorant composition as claimed in any preceding claim, further
15 comprising an anti-free-radical agent and/or a polymeric conditioning agent
prepared from monomer entities selected from one or more of: acrylic acid,
acrylamide dimethyldiallylammonium chloride and any mixtures thereof.
- 6 A method of preparing a hair colorant composition as claimed in any
preceding claim, comprising mixing in a suitable manner a alkali metal
20 bicarbonate, a hair colouring agent and a suitable carrier.
- 7 A container comprising a chamber comprising a flowable hair colorant
composition as claimed in any of claims 1 to 5, the chamber being in fluid

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connection with a dispensing means such that composition is capable of being applied to the hair by the dispensing means.

8 A container as claimed in claim 7, in which the dispensing means comprises a brush or sponge through which the composition may flow.

5 9 A method of colouring, tinting and / or dying hair by application of a hair colorant composition as claimed in any of claims 1 to 5.

10 A method of colouring, tinting and / or dying hair as claimed in claim 9, in a single application to the hair.

INTERNATIONAL SEARCH REPORT

Int. l. Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/13

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 973 900 A (HUSEMEYER HANS ET AL) 10 August 1976 see the whole document ---	1-6,9,10
X	EP 0 658 339 A (SQUIBB BRISTOL MYERS CO) 21 June 1995 see the whole document ---	1-3,6,7, 9,10
X	FR 1 292 212 A (SOCIÉTÉ MONSAVON-L'ORÉAL) 26 March 1962 see the whole document ---	1-3,6,9, 10
A	US 3 567 363 A (WOLFRAM LESZEK JANUARY) 2 March 1971 see column 1, line 26-35 see column 1, line 55-64 see column 3, line 16-21 ---	1-10
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☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>CHEMICAL ABSTRACTS, vol. 98, no. 26, 27 June 1983 Columbus, Ohio, US; abstract no. 217077, MATSUMOTO, TASUKU: "Swelling treatment of silk yarn and fabrics" XP002040400 see abstract & DAIICHI KOGYO SEIYAKU SHAHO (1983), 422, 12-16 CODEN: DKSSAB, 1983,</p> <p style="text-align: center;">-----</p>	1-10

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/EP 97/02713

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3973900 A	10-08-76	CH 550585 A	28-06-74
		CH 571859 A	30-01-76
		AT 323898 B	11-08-75
		BE 781313 A	17-07-72
		DE 2157844 A	24-05-73
		FR 2135138 A	15-12-72
		GB 1349118 A	27-03-74
		NL 7204040 A,B	03-10-72
EP 0658339 A	21-06-95	AU 7908294 A	08-06-95
		CA 2136459 A	31-05-95
		CN 1107328 A	30-08-95
		JP 7206649 A	08-08-95
		US 5441542 A	15-08-95
		US 5628799 A	13-05-97
FR 1292212 A	12-10-62	CH 402284 A	
		DE 1163498 B	
		GB 938045 A	
		NL 264736 A	
		US 3164522 A	05-01-65
US 3567363 A	02-03-71	BE 687130 A	20-03-67
		DE 1619064 A	22-10-70
		FR 1503640 A	08-02-68
		GB 1164103 A	17-09-69

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